

CLAIMS

I claim:

1. A system for monitoring and alerting to change in media adjacent a part of said system, comprising:
  - at least one array of optical fibers affixed to a support, each optical fiber having an end exposed orthogonal to said media,
  - wherein an optical signal is maintained on each said optical fiber at least during a portion of operation of said system, and
  - wherein said array is configured to provide a pre-specified level of detail regarding said change;
  - at least one source in operable communication with each said optical fiber at least during a portion of operation of said system;
  - at least one optical coupler; and
  - at least one sub-system in operable communication with each said optical fiber at least during a portion of operation of said system,
  - wherein said sub-system processes said data to provide real time alerting to said change, and
  - wherein said sub-system records and displays said change.
2. The system of claim 1 in which said at least one change is selected from the group consisting of: reflection coefficient, transmission coefficient, and combinations thereof.
3. The system of claim 1 in which said optical fibers are energized in a pre-specified sequence using a multiplexer.
4. The system of claim 1 in which said optical fibers are arranged in at least one vertical array upon a rigid support.
5. The system of claim 1 in which said optical fibers are plastic.

6. The system of claim 1 in which said optical fibers have an index of refraction of approximately 1.492.

5 7. The system of claim 1 in which said optical fibers are each incorporated as one of a pair in said optical coupler.

8. The system of claim 1 in which said subsystem includes at least an optical receiver, a high pass filter, an amplifier, a detector and a display.

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9. The system of claim 8 further comprising a control device.

10. The system of claim 1 in which said subsystem comprises at least a power meter.

15 11. The system of claim 10 further comprising a processing and control device incorporating a display.

12. The system of claim 3 further comprising an umbilical cable in operable communication with at least said multiplexer, said source and said sub-system.

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13. The system of claim 1 further comprising an anchoring device.

14. The system of claim 1 in which said source is a light emitting diode (LED).

25 15. The system of claim 14 in which said LED emits red light.

16. The system of claim 1 in which said source is energized using a cyclical signal.

17. The system of claim 16 in which said cyclical signal is a square wave.

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18. The system of claim 17 in which said square wave is cycled at approximately three KHz.
19. The system of claim 1 in which said optical receiver is selected from the group consisting of a phototransistor, a photodiode, and combinations thereof.
20. The system of claim 1 in which said sub-system further comprises:  
at least one multi-channel multiplexed data acquisition printed circuit board incorporating at least one analog-to-digital converter;  
at least one personal computer, incorporating a display, in operable communication with said multi-channel multiplexed data acquisition printed circuit board; and  
software loadable on said personal computer for processing said data.
21. The system of claim 1 in which said coupler is a four-port optical splitter.
22. A system for monitoring and alerting to change in media, comprising:  
at least one optical means for sensing change in at least one characteristic of said media and transmitting data representing said change;  
at least one array of said optical means,  
wherein an end of each said optical means is affixed to a support having a long axis, and  
wherein each said optical means is exposed orthogonal to said media with respect to said long axis, and  
wherein said array is configured to provide a pre-specified level of detail regarding said change;  
at least one means for energizing each said optical means, said means for energizing in operable communication with each said optical means;  
at least one means for processing said data, said means for processing in operable communication with each said optical means,

wherein said means for processing provides real time alerting to said change, and  
wherein said means for processing displays and records said change; and  
at least one means for coupling together said optical means, said means for  
energizing and said means for processing.

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23. A method for monitoring and alerting to change in media, comprising:
- providing at least one array having at least one optical fiber, said array  
affixed to at least one support having a long axis;
  - exposing an end of each said optical fiber orthogonal to said media with  
respect to said long axis ;
  - configuring said array to provide a pre-specified level of detail regarding  
said change;
  - impressing an optical signal from at least one source on each said optical  
fiber in said array;
  - collecting said impressed optical signal and a response signal of said  
media to said impressed optical signal;
  - providing a sub-system in operable communication with each said optical  
fiber,
- wherein said sub-system processes said response to enable real time alerting to  
said change, and
- wherein said sub-system displays and records said change; and
- providing at least one coupler in operable communication with each said  
optical fiber, said source, and said sub-system.

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